Successive Collision Theory (SCT): A Comprehensive Alternative Framework to the ΛCDM Model That Offers Viable Solutions to All 231 Known ΛCDM Tensions / Issues.

"Includes a summarization of the three changes needed to the field equations of general relativity to solve for dark energy, dark matter, and black holes."

DR JM NIPOK
Theoretical Astrophysicist
dr.jm.nipok@thenaturalstateofnature.org
Jan 08 2026

Abstract

The standard Lambda Cold Dark Matter (ΛCDM) model, while successful, faces increasing tension with high-precision observations, particularly concerning the expansion rate (Hubble Tension), the nature of the dark sector, and the existence of early massive structures. This paper presents Successive Collision Theory (SCT), a comprehensive alternative derived from a direct interpretation of General and Special Relativity within an eternal, infinite, and hierarchically nested reality. SCT posits that the universe's structure and thermal state arise not from a singularity, but from superluminal collisions between immense nested successions of comoving frames of reference. This framework provides logical, physically consistent explanations for numerous cosmological anomalies marked as "unknown" by ΛCDM, including the Cosmological Constant Problem, the Horizon Problem (rendering inflation unnecessary), both Dark Energy-related and Dark Matter-related anomalies, the Lithium-7 problem, and every other inconsistency that the current model struggles to cohesively explain, could fit within a single range of parameters governing a succession of superluminal collisions.

1. Introduction: The Crisis in Standard Cosmology

The ΛCDM model has established the current epoch of cosmic evolution; however, its foundations are challenged by persistent observational and theoretical inconsistencies. Chief among these is the ~4σ Hubble Tension, the ~10 120 catastrophe of the Cosmological Constant Problem, and a host of anomalies

concerning small-scale structure, such as the Core–cusp problem and the rapid formation of Early Massive Galaxies and Supermassive Black Holes (SMBHs). These failures suggest that a fundamental revision of the universe's initial conditions and its governing dynamics is required. As our technologies continue to improve, we will consistently find observations that break predictions as long as we remain tethered to the assumption of a hot, dense center.

Once we remove the singular hot dense center in favor of a better catalyst able to explain all the current tensions in cosmology, we can see how dark energy is a predicted effect of being part of a nested sequence of larger structures and is not related in any way to vacuum energy. When we remove certain conclusions that we blamed on dark matter in place of collision dynamics, we can see that dark matter might not be as dark as we once thought.

Remove a century-old assumption from one of the pillars of modern physics, and we remove singularities, inflation, an unknown catalyst, and we shine light on the matter and energy that we kept hidden in the dark. And all it takes is the math of relativity.

2. Theoretical Foundation: Nested Comoving Frames and Collisional Origin

Successive Collision Theory's core premise is that when we apply the field equations of the general theory of relativity against an isotropic homogeneous eternally infinite 4D Minkowski spacetime, instead of inflating bubble universes, we find that mass-energy and spacetime are organized in nested successions of comoving frames of reference. General relativity dictates that gravitationally bound structures will get larger as you zoom out. That statement is observed already within our visible patch of relative spacetime.

Each parent frame dictates the base perception of space and time for its nested components, and the physics of this hierarchy govern all dynamics. Since we know that the faster we move through space, the slower we move through time, we can say that at each level in this nested structure of comoving siblings playing follow the leader(s), bodies all sharing the same base relative trajectory and same base relative velocity would experience the same base perceptions of both time and space.

A perception that each sibling would see further refined based on their own relative velocity inside that shared comoving frame of reference, and all gravity

wells the body passes through on its journey. This refined perception is then passed on to all its child bodies in a nested succession, and that is why each rung in the ladder of cosmological hierarchy can be considered a pocket of spacetime. At any rung, should the velocity increase by 67% or decrease by 42%, there would be a non-zero change in the perception of spacetime events occurring outside the reference frame whose course was altered. If sustained long enough, the effects would become measurable.

3. The Origin of the Observable Universe

The universe's initial state is not a singularity, but a massive energy release resulting from superluminal collisions between two or more immense nested pockets of spacetime. The relative velocity between these spatially separated, non-inertial frames can exceed the speed of light without violating local SR constraints, converting immense kinetic energy into dense swirling eddies of hot plasma. Our cosmic speed limit dictates how fast objects can be accelerated to within our relative spacetime while adhering to the laws of physics, but has no bearing on the potential relative velocities that could be seen between two separate successions that are each tens of thousands or hundreds of thousands of rungs removed from a shared parent frame of reference.

This process yields two crucial initial conditions:

Rapid Thermalization: Subsequent collisions (primary, secondary, tertiary) at similar energy levels create distributed, overlapping hot spots, leading to widespread thermal equilibrium across the entire collision region (estimated at 67%–84% the size of the final CMB surface). This mechanism solves the Horizon Problem by achieving homogeneity via collisions over a very short timescale (e.g., 380,000 days/weeks instead of years), negating the need for cosmic inflation. And secondly, Initial Mass Seeds: Leftover, unconverted pieces of mass and dense eddies of plasma from these collisions act as the massive seeds for Early SMBHs and galaxies, easily explaining their existence at early cosmological times. Electrons are not needed for stars to form and begin fusion, just as they are not needed for black holes to start accumulating mass. Cosmic formations began before recombination gave us stable atoms.

Head-on collisions create more heat and energy and much less angular momentum, while grazes create hot dense, swirling eddies where each stage

occurs with similar degrees of kinetic energy release. The first collisions would have similar kinetic energy ranges as would the second, third, fourth, etc so smooth heat dissipation across a large swath of relative spacetime would be predicted. With superluminal collisions, we could have unknown physics still to be uncovered and a possibility for exotic states of matter created by an over density of higher-energy photons. We also have the possibility to see more mass end up being created after cooling than the two masses that collided head-on at superluminal speeds.

Head-on collisions, where less kinetic energy is converted into retained angular momentum, would predict filaments and strands to be created. Inside whatever shared parent frame the two nested successions were traversing, one would almost always have a higher relative velocity within that parent frame than the other. Initial superluminal collisions that occur head on would be predicted to create long strands and filaments due to streams of hot dense plasma being released, and as those strands moved through spacetime, eddies form and due to both gravity and electromagnetism, areas would clump and cool and spin off and create tentacle-like offshoots. The length of the main parts of superclusters and cosmic filaments could be tied to the relative velocity of the faster pocket compared to the slower one, while the different widths of those main arteries would be relative to the masses of the bodies that collided to vaporize that mass into hot dense swirling plasma.

When two immense pockets cross paths at superluminal speeds, it is not just collisions of planets and black holes and stellar nurseries and stars, moons, and asteroids, etc., that turn mass back into hot dense swirling energy. Nebulous gas, stray atoms, stray nucleons, neutrinos, photons, and even vacuum energy could all experience incredible friction at quantum scales vaporizing spacetime itself also into hot dense swirling energy. Few collisions have zero left over angular momentum.

The random nature of successive superluminal collisions allows for a wide range of starting parameters to still see simulations creating pockets of spacetime like the ones within our cosmic horizon. When two immense nested successions of comoving frames of reference pass through each other the number of instances where they just graze each other would be a tiny percentage of those collisions so statistically speaking we are far more likely to find our entire visible universe is in orbit and possibly being orbited and likely has siblings and first cousins and maybe even second cousins that are similar in nature to our visible patch of

spacetime all created during the same sequence of events that forged our relative patch. Our visible universe and the parts beyond our cosmic horizon almost certainly has an approximate axis or rotation and period of rotation as well as most likely also having a period of revolution. Within the shared comoving frame of reference shared by our visible speck of spacetime and it siblings playing follow the leader(s) with their most massive sibling(s) our relative pocket of spacetime would have an average luminosity, average thermal signature, a gravitational field, probably a magnetic field, and possibly an electric field, and a relative trajectory and velocity within that shared parent frame of reference. It would in fact have an approximate center.

To confirm my suspicion that a small set of basic premises applied to general relativity and special relativity against eternal time and infinite space could provide a solution to every item that the Lambda-CDM model struggles to explain, I added a page to my blog that lets you select one or more AI engines and then copy/paste a prompt to teach it successive collision theory, and then it provides an easy way to copy/paste any of the 231 separate tensions and see how that AI can answer the problem easily with one or more possible answers when we remove the hot dense center and replace it with a succession of superluminal collisions. This link will let you play with this tool and see how SCT can answer every single issue that the Lambda-CDM model cannot cohesively explain.

https://thenaturalstateofnature.org/TNSON_BLOG/231_LambdaCDM_Issues(Tensions)_Solved_By_Removing_One_Assumption.html

4. Reinterpreting Dark Energy and the Hubble Tension

SCT redefines Dark Energy (Λ) from a mysterious vacuum force to the cumulative effect of gravitational dissipation across the nested hierarchy:

Dark Energy Source: Dark Energy is not vacuum energy (resolving the Cosmological Constant Problem). Instead, it is the result of the gradual dissipation of gravitational cohesion across nested structures as orbits between objects slowly decay. Some inwards, most outwards, but across a nested succession of parent comoving frames of reference, we would predict to see the average distance between relative siblings increasing over time.

Mechanism: This average increase in orbital diameters across successive comoving frames weakens the tensor mesh of overlapping gravity wells. Since

each rung in the ladder of nested comoving frames of reference acquires its base perception of time and space from its parent and its succession of parents, then it would be predicted at our scale factor that this successive nested weakening would appear to us as the fabric of spacetime being "torn apart". A prediction of SCT is that if there is a nested succession of rungs each seeing an average dissipation in massenergy cohesion to relative spacetime, then over time, we would predict the rate to increase exponentially.

This requires a change to the field equations of general relativity (one of three), where we see Lambda in the field equations becoming a ratio, capital Lambda over lowercase lambda. This represents the ratio between the relative field strength of the local relative overlapping gravity wells and the succession of parent gravity wells they are in a constant battle against. Since it is based on the most direct succession of nested parent frames above our visible horizon, and those parent structures themselves are always in motion, even though the tendency is to increase exponentially over time, this model could explain random periods where the expansion seems to slow down.

Because few orbits are truly circular and most are elliptical in some way, even though the average rate should increase exponentially over time, the model supports periods of a decreased rate if such observations were conclusive. It also means that since we exist inside a nested succession of orbits where few are true circles, the very cornerstone of relativity, being inside an inertial reference frame, is itself relative.

Hubble Tension: Since spacetime perception is hereditary (passed down from parent frame velocity/trajectory), changes in the relative velocity of large-scale parent structures (e.g., the Laniakea Supercluster) could alter the local perception of space and time outside that frame, although more of this issue is solved by seeing that our cosmological constant is a ratio, not a constant, as we peer through the past we can not overlook how light might redshift or blueshift as it moved between pockets with different based perceptions of spacetime since each pocket maintains its own relative tensor mesh of overlapping gravity wells binding all of the relative spacetime together in a shared journey.

5. Dark Matter as a Property of Gravity

Dark Matter is unlikely to be found by uncovering some new type of particle. All indications are that gravity moves at the speed of light an all indications are that all forms of energy move in waves and although many will argue that gravity is not a force but a curvature of spacetime, that simplistically ignores that every object with mass requires some mechanism to tell all the different areas of relative spacetime not only how much to bend or warp but also where AND when.

Occurring at the same speed as c tells us that someday we should expect to locate the as of yet undiscovered wavelength of EM radiation (potentially with a unique polarization or property) that is responsible for the force-carrying waves of gravity. When we examine carriers of those instructions and their spherical waves that emanate outwards from all objects with mass, then the source of the remaining instances of dark matter that SCT can not otherwise explain becomes predictions of what happens to pockets of spacetime where many bodies share the same relative trajectory and the same relative velocity. Constructive interference happens when waves are in phase and when the amplitude increases, the intensity or energy carried by the wave increases, but not linearly, exponentially.

When celestial bodies share the same relative trajectory and velocity (comoving motion), their spherically emanating gravitational waves can align in phase, leading to constructive interference. Spherical waves in phase will, IMHO, someday be proven to be the reason behind the two remaining effects we associate with dark matter, the observed non-Keplerian Galaxy Rotation Curves and Gravitational Lensing effects, without requiring additional exotic mass.

Structure Resolution: This wave-mechanics approach naturally resolves all major ΛCDM dark matter anomalies: the Core–cusp problem, Missing satellites, and the Too-big-to-fail problem, as the required gravitational boost is entirely dependent on the motion and relative alignment of known baryonic mass, not non-baryonic halos.

Multiple experiments could be done (via remote observations) to help locate the second of three changes needed to the field equations of the general theory of relativity that would wrap a formula or function around the stress-energy-momentum-tensor to represent the exponentially increasing strength of multiple bodies sharing the same relative motion.

The third of three changes to the EFE is not tied to SCT, Dark Energy, or Dark Matter. It has to do with quark degeneracy pressure at the center of black holes

caused by a lattice-QCD based equation of state for a finite-density black hole able to suppress gravitational collapse.

Details for those interested can be found here:
https://doi.org/10.5281/zenodo.18092309

6. Conclusion

Successive Collision Theory provides a unified and highly explanatory framework that resolves the major theoretical and observational crises facing the ΛCDM model. By replacing the hot dense singularity with collisional thermalization, redefining Dark Energy as gravitational dissipation, and explaining Dark Matter via gravitational wave mechanics, the SCT offers a physically plausible and empirically superior fit to the known universe, as summarized by the comprehensive list of solved anomalies.

Further theoretical work is required to fully quantify the function wrapped around the stress-energy momentum tensor to accurately model the predicted gravitational wave interference. Empirical verification will focus on observational signatures unique to the collision model, such as redshift drift anisotropy and specific CMB anomalies, among other proposed methods of falsifiability. The evidence strongly suggests that the ΛCDM era is ending, giving way to Successive Collision Theory as the next paradigm to explain not only what created our visible patch of spacetime but the very nature of time, space, and the universe itself.

The second season of our podcast, "A Leap Year Crossing Light Years" offers a step-by-step explanation of all topics discussed here (and a bit more) by breaking it down into 366 sequential propositions.

https://youtube.com/playlist?list=PL_zrKFt1ZzKsgjh9bsuEHdMqI5AdUP68p&si=MXGZoO6r8HcI4VRD

You can find our first season on most podcast streaming platforms with the hashtag #thenaturalstateofnature.

Thank you for your consideration.
DR JM NIPOK
dr.jm.nipok@thenaturalstateofnature.org
DR JM NIPOK (0009-0006-3940-4450) - ORCID